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### (54) A double action pistol with safety decocking mechanism

(57) A double action pistol with a safety-decocking mechanism in which a conventional safety catch is combined with a vertically reciprocable, downward biased plunger (12) located with the pistol's slide (2). When the plunger (12) is lifted it is capable of shifting the firing pin

(3) into an intermediary position in which both ends (11,10) of the firing pin (3) are withdrawn and the plunger (12) and firing pin (3) interlock.

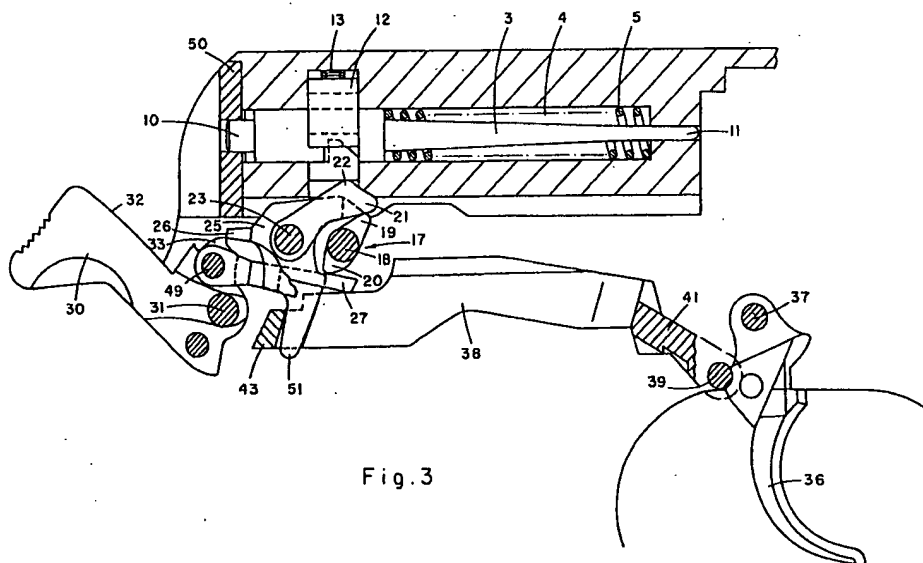


Fig. 3

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## Description

### FIELD OF THE INVENTION

The present invention relates to a pistol and more specifically to a double action pistol with a safety decocking mechanism.

### BACKGROUND OF THE INVENTION

A double action pistol comprises a slide also referred to at times as a breech block, slidably accommodated in a pistol housing so as to be reciprocable between a cocked, retracted and a relaxed, forward position and biased into the forward position by a recoil spring. Starting from the forward position, the retracted position in which a round of ammunition is loaded into the barrel's breech, is either reached by manual cocking or by recoil in consequence of firing, while the forward position is reached from the cocked, retracted position by the action of the recoil spring when the trigger is pulled. The slide holds a barrel and in alignment therewith a firing pin reciprocable within an axial bore so as to be shiftable between a rear, pre-firing and a fore, firing position. A double action pistol has a hammer which on pulling the trigger is first cocked and, upon continuing the trigger pull the hammer is propelled back to strike the firing pin.

The pistol housing further has a magazine chamber and accommodates a firing mechanism comprising a trigger with associated trigger bar, a sear with associated interrupter, a spring loaded, eccentrically pivoted hammer and a safety catch.

When a double action pistol with a loaded magazine in the magazine chamber is to be cocked manually, say prior to an expected shooting event, the slide is pulled back and then released whereby the hammer is revolved into a reclined position in which the associated spring is compressed giving rise to a bias. As long as the trigger is not pulled, the sear locks the hammer in the cocked position. When the trigger is pulled, the rearward moving trigger bar rotates the sear out of engagement with the hammer whereupon the latter is released and strikes the firing pin.

In practice, it very often happens that in anticipation of a pistol shooting event, a combatant cocks his pistol and shifts the safety catch to the safe position whereby the trigger is neutralized. However, such neutralization notwithstanding the danger exists that an accidental shock or impact may release the hammer and cause the pistol to be fired. It is possible to preempt such a situation by manually decocking the hammer in guiding it gently forward into the relaxed, forward position without allowing it to forcibly strike the firing pin. When now the safety catch is shifted to the firing position and the trigger is pulled, the trigger bar will in a first phase, in collaboration with the sear and interrupter, recock the hammer. By further pulling the trigger it will, in a second phase, bring about the release of the hammer so that

the latter forcibly strikes the firing pin, thereby triggering off the firing and subsequent recoiling operation.

However, even gentle manual decocking may at times cause unintended firing of the pistol. Accordingly, to avoid the need for manual decocking, some prior art double action pistols are provided with mechanical decocking mechanisms in association with a safety catch located on the slide. In practice, such arrangements turned out to have a serious flaw in that when the slide is gripped for manual cocking the safety catch may unintentionally be shifted into the safe position in which the hammer is decocked, with the consequence that contrary to what had been intended by the very manual cocking operation, in the end result the pistol is not ready for firing.

Some prior art double action type pistols do not have a safety catch at all and comprise instead a decocking mechanism with an actuation lever located on the housing. This arrangement has the serious drawback that a hard impact may unintentionally cause the pistol to be fired.

For ensuring that no firing occurs in a double action pistol during decocking, the firing pin should best be shifted to an intermediary position in which both the front and rear ends of the pin are retracted within the accommodating bore of the slide and be arrested in that position. Known decocking mechanisms do not provide for this.

It is thus the object of the present invention to provide a double action pistol with an improved combined safety decocking mechanism located in the housing, which simultaneously to shifting the firing pin and arresting it in an intermediary position as specified, also decocks the hammer and neutralizes the trigger mechanism.

### SUMMARY OF THE INVENTION

In accordance with the present invention there is provided a double action pistol having a housing slidably accommodating a slide reciprocable between retracted cocked and relaxed forward positions, which slide holds a barrel and in alignment therewith a firing pin located within an axial bore and shiftable between rear, pre-firing and fore, firing positions, said housing further accommodating a trigger with associated trigger bar, a sear with associated interrupter, a spring loaded hammer, characterized by a safety-decocking mechanism comprising a conventional safety catch mechanism and in combination therewith:

- (i) a vertically reciprocable, downward biased plunger within the slide;
- (ii) means within the housing associated with said safety catch mechanism for lifting said vertically reciprocable plunger in the safe position of the catch;
- (iii) said plunger and firing pin having complementary members which constitute a male-female inter-

locking arrangement, whereby when the plunger is lifted the firing pin is shifted into an intermediary position in which both ends of the firing pin are withdrawn and the plunger and firing pin interlock.

## DESCRIPTION OF THE DRAWINGS

For better understanding, the invention will now be described by way of example only, with reference to the annexed drawings without being limited thereto. In the drawings:

Fig. 1 is an elevation with partial cutout of a double action pistol according to the present invention in a non-cocked state with the safety catch in the firing position;

Fig. 2 is an elevation, with partial cutout of the sear part of a double action pistol according to the present invention in the cocked state with the safety catch in the firing position, also showing the firing mechanism;

Fig. 3 is a similar view as in Fig. 2 with the hammer in the cocked position and the safety catch in the safe position;

Fig. 4 is a similar view as in Figs. 2 and 3 with the hammer decocked and the safety catch in the safe position;

Fig. 5 is an isometric view of the firing pin and plunger of a double action pistol according to the present invention; and

Fig. 6 is an isometric view of the trigger bar and interrupter of the firing mechanism of a double action pistol according to the present invention.

## DESCRIPTION OF A SPECIFIC EMBODIMENT

The double action pistol according to the present invention shown in the drawings has a housing 1 with a slide 2 holding a firing pin 3 within a suitably dimensioned axial bore 4. Firing pin 3 is biased rearward by a coiled spring 5. The rear of firing pin 3 is in form of a four-sided polygonal block 6 with outwardly curved top and bottom sides and having a trapezoidal recess 7 with a slanted side wall 8 and an upright side wall 9. At its rear, firing pin 3 has a rearward projection 10 and at its front a striking tip 11.

A vertical bore at a rear portion of the slide 2 accommodates a cylindrical plunger 12 biased downwards by a spring 13. Plunger 12 has a cutout 14 with a lower edge 15 formed with an upward projecting tooth 16 matching the trapezoidal recess 7 of the firing pin 3. When the plunger 12 is depressed by the action of the biasing spring 13, the rear block 6 of the firing pin 3 is free to reciprocate horizontally within cutout 14 of the plunger. Recess 7 of the firing pin and tooth 16 of the plunger constitute together a male-female interlocking arrangement.

Housing 1 accommodates a safety catch 17 keyed on an axle 18 and fitted with an actuating lever (not

shown). The axle 18 is rotatably shiftable between safe and firing positions, and has first and second, essentially opposed radial projections 19 and 20.

The first radial projection 19 is adapted for cooperation with a swingable lever 21 comprising at its top a bulge 22 and being rotatably mounted on an axle 23 journaled in the housing 1. A sear 25 is also rotatably mounted on said axle 23 with an anti-clockwise bias provided by a helical spring (not shown) mounted on the same axle. The sear 25 has an rearward projecting upper bracket 26 for cooperation with the hammer, and a forward projecting lower arm 27 for cooperation with the trigger mechanism.

A hammer 30 is mounted on the rear side of housing 1 by means of an axle 31 with a clockwise bias (not shown). Hammer 30 has a striking surface 32 and a tooth 33 for cooperation with the rear bracket 26 of sear 25.

As shown in the drawings, there is provided a trigger mechanism as known *per se*, comprising a trigger 36 pivoted to the housing at 37 and biased (by means not shown) into the forward, released position. A trigger bar 38 is pivotally linked to the trigger 36 at 39 with an upward bias (not shown). The trigger bar comprises a front shank 41 and a frame having two longitudinal frame members 42 extending each along one of the side walls of the magazine chamber, and a terminal lateral frame member 43 having a recess 44 (see Fig. 6). Near their rear end portions frame members 42 have each a shoulder 46 for cooperation with a matching shoulder 47 of an interrupter 48 linked to the hammer 30 by means of a pin 49 engaging matching bores of the hammer and interrupter. Interrupter 48 is hook-shaped having a downward projecting leg portion 51 which is accommodated within recess 44 of the trigger bar frame member 43.

The operation of the pistol according to the present invention as herein described is as follows:

In the state shown in Fig. 1, the pistol is completely inactive. In this state the hammer 30 is in its relaxed, uncocked position and the firing pin 3 is in its rear, biased position in which its rearward projection 10 protrudes through a rear firing pin retainer plate 50 and the striking tip 11 is withdrawn and does not protrude from the breech block's front face. Plunger 12 is in its downmost position in which tooth 16 of the plunger and recess 7 of the firing pin are out of engagement so that the firing pin can reciprocate back and forth unobstructedly.

Attention is now directed to Fig. 2 which shows the position reached after slide 2 first has been pulled manually to the rear for cocking and loading a round of ammunition into the breech, and then having been released and driven forward by the biasing recoil spring (not shown). Due to the manual cocking, hammer 30 is in the reclined position in which the bracket 26 of the sear 25 engages tooth 33 of hammer 30, whereby the hammer is fully cocked with the hammer spring (not shown) fully compressed and the pistol being ready for

firing. At this stage the user can choose between firing the pistol or decocking and holding it in a ready-to-shoot safe state.

Attention is now directed to Figs. 3 and 4 for a description of the decocking and shifting to the safe position. As seen, Fig. 3 shows an intermediary state in which the safety catch 17 is in the safe position, in that the axle 18 has rotated anti-clockwise whereby the projection 19 has actuated lever 21, and turned it anti-clockwise, and the bulge 22 of the lever 21 engages the bottom of plunger 12 and urges it upwards against the biasing effect of the compression spring 13.

As the plunger 12 is urged upward, the slanted surface of projection 16 of the plunger slides on the slanted wall 8 of recess 7 of the firing pin 3 and when the plunger 12 reaches its uppermost position, tooth 16 of the plunger and recess 7 of block 6 of the firing pin interlock, whereby the firing pin becomes arrested in an intermediary position in which the rear projection 10 and the striking tip 11 remain both retracted within retainer plate 50 and bore 4, respectively. In this state the firing pin is secure in that it can neither be struck by hammer 30 nor strike a round of ammunition in the chamber.

Only after the safety catch 17 is fully shifted to the safe position and firing pin is secure as specified, the second radial projection 20 of the axle 18 depresses arm 27 of the sear 25, whereby the latter is turned clockwise around its axle 23, resulting in the disengagement of the rearward bracket 26 from tooth 33 of hammer 30. In this way the hammer is released and propelled from the biased reclined position back to the forward relaxed position shown in Fig. 4 while the firing pin 3 remains secure inside bore 4 so that the forward swinging hammer cannot strike it.

As further seen in Fig. 4, simultaneously with the clockwise rotation of sear 25 by the action of the projection 20 of the safety catch 17, arm 27 of the sear depresses the trigger bar 38 against its upward bias whereby shoulders 46 of the trigger bar disengage interrupter 48, by which the trigger mechanism is neutralized so that pulling the trigger does not activate the firing mechanism.

For shooting, the safety catch 17 is shifted back to the firing position of Figs. 1 and 2 whereby the plunger 12 is released and propelled downwards by spring 13. This in turn releases firing pin 3 which is shifted fully back to the rear by the action of spring 5, so that the rear projection 10 projects across retainer plate 50 as shown in Fig. 2. At the same time, the sear 25 is rotated anti-clockwise by its biasing spring, enabling the trigger bar 38 to re-engage with the interrupter 48.

When now the trigger 36 is pulled the hammer will first recline and then be propelled back forward to strike the firing pin 3, similar as in known double action pistols.

## Claims

1. A double action pistol having a housing (1) slidably accommodating a slide (2) reciprocable between

retracted cocked and relaxed forward positions, which slide holds a barrel and in alignment therewith a firing pin (3) located within an axial bore (4) and shiftable between rear, pre-firing and fore, firing positions, said housing (1) further accommodating a trigger (36) with associated trigger bar (38), a sear (25) with associated interrupter (48), a spring loaded hammer (30), characterized by a safety-decocking mechanism (17) comprising a conventional safety catch mechanism and in combination therewith:

- (i) a vertically reciprocable, downward biased plunger (12) within the slide (2);
- (ii) means (21,22) within the housing (1) associated with said safety catch mechanism (17) for lifting said vertically reciprocable plunger (12) in the safe position of the catch;
- (iii) said plunger (12) and firing pin (3) having complementary members which constitute a male-female interlocking arrangement (7,16), whereby when the plunger (12) is lifted the firing pin (3) is shifted into an intermediary position in which both ends of the firing pin are withdrawn and the plunger and firing pin interlock.

2. A double action pistol according to Claim 1, wherein said means for lifting said vertically reciprocable plunger (12) into the safe position of said safety catch mechanism comprises a swingable lever (21) with an upper bulge (22), whereby the plunger (12) is pushed upward when said safety catch mechanism is in the safe position.

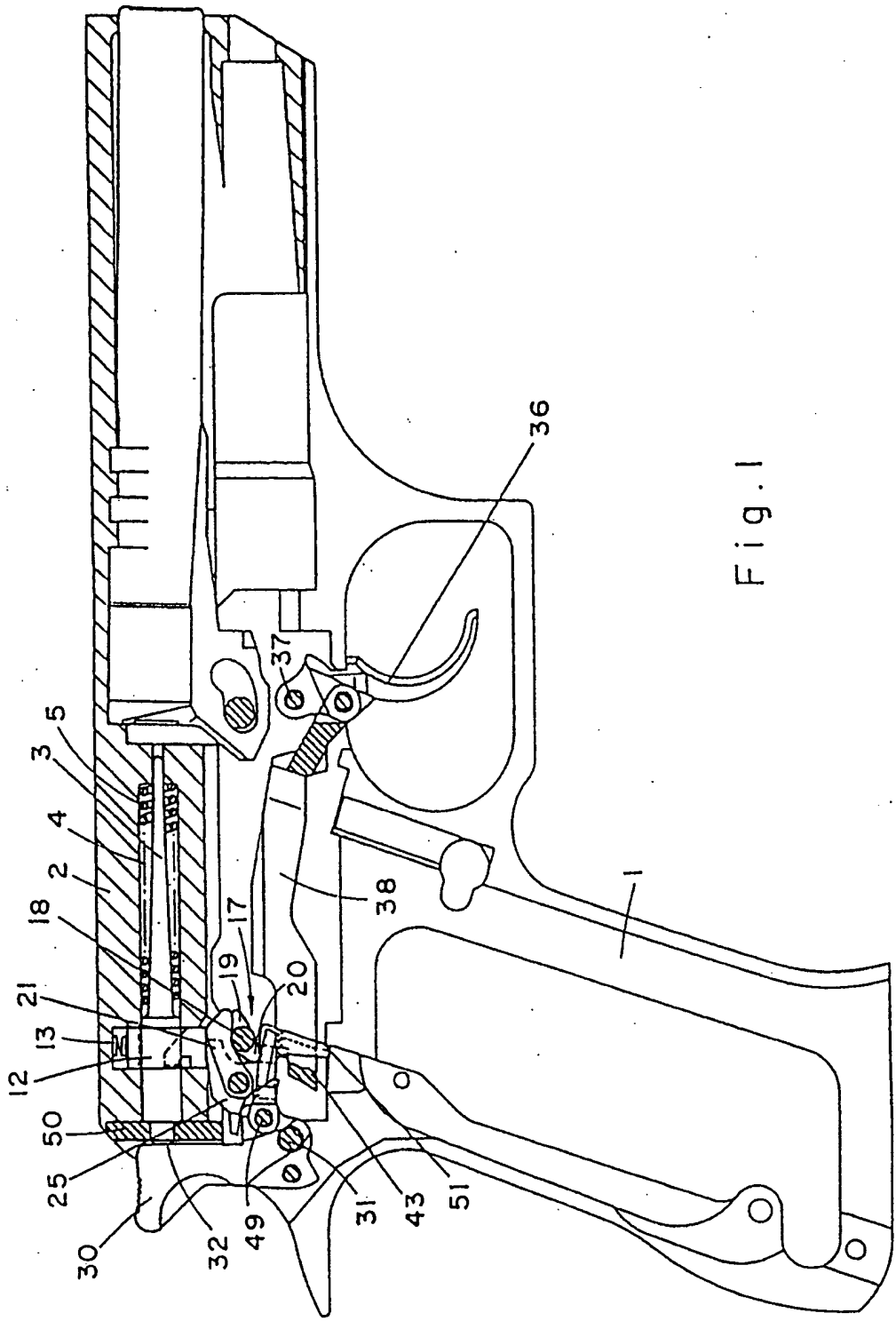
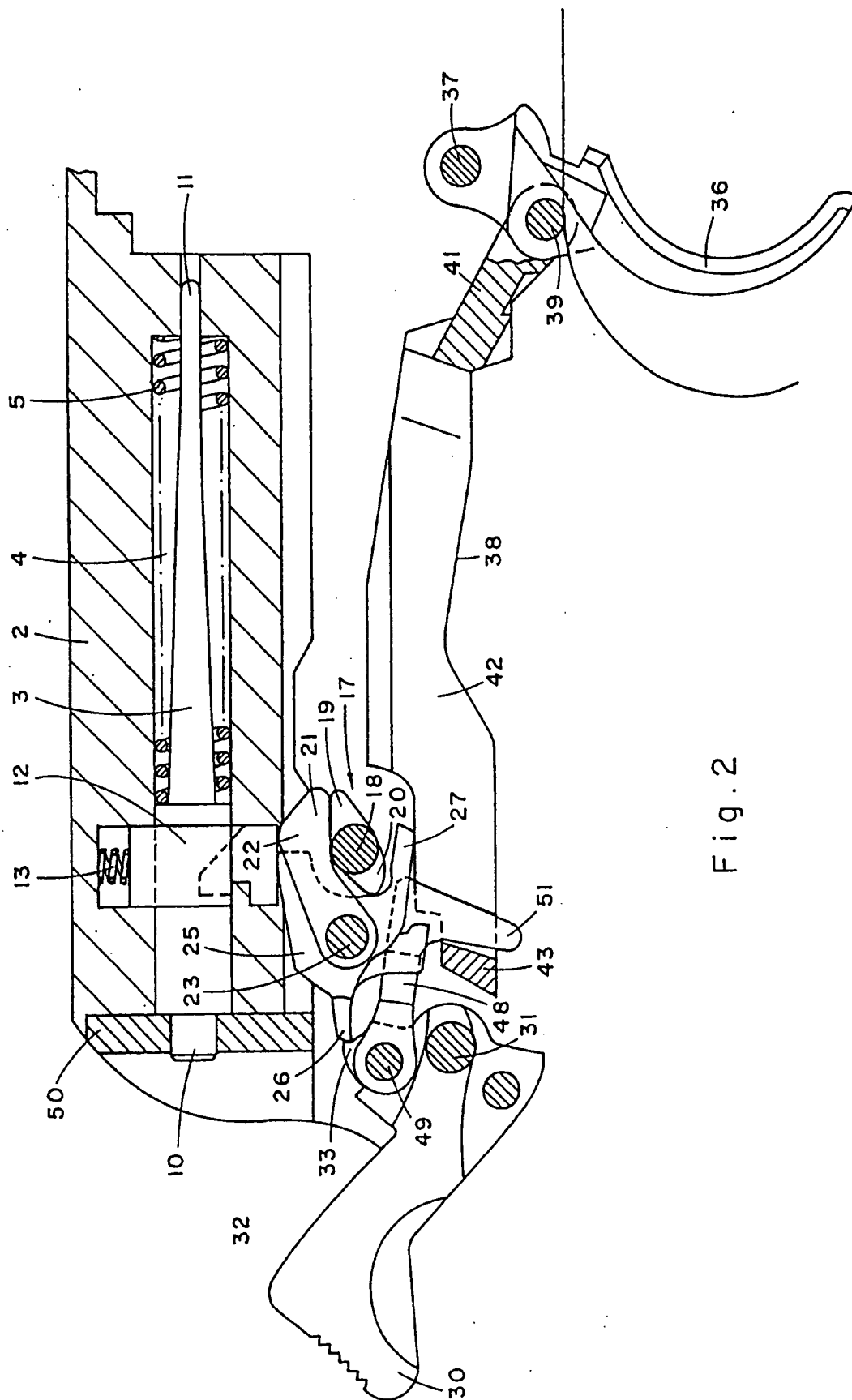
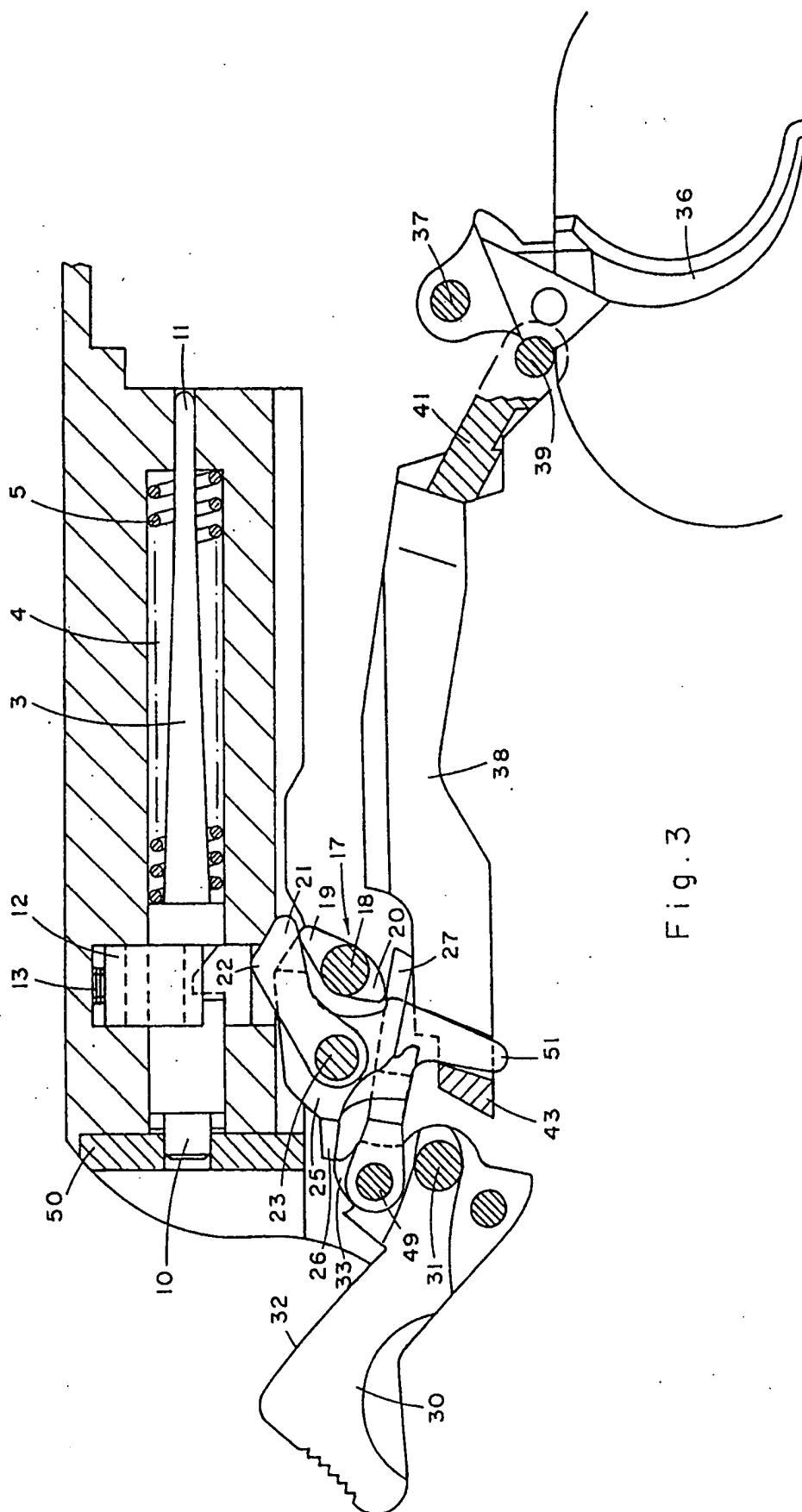
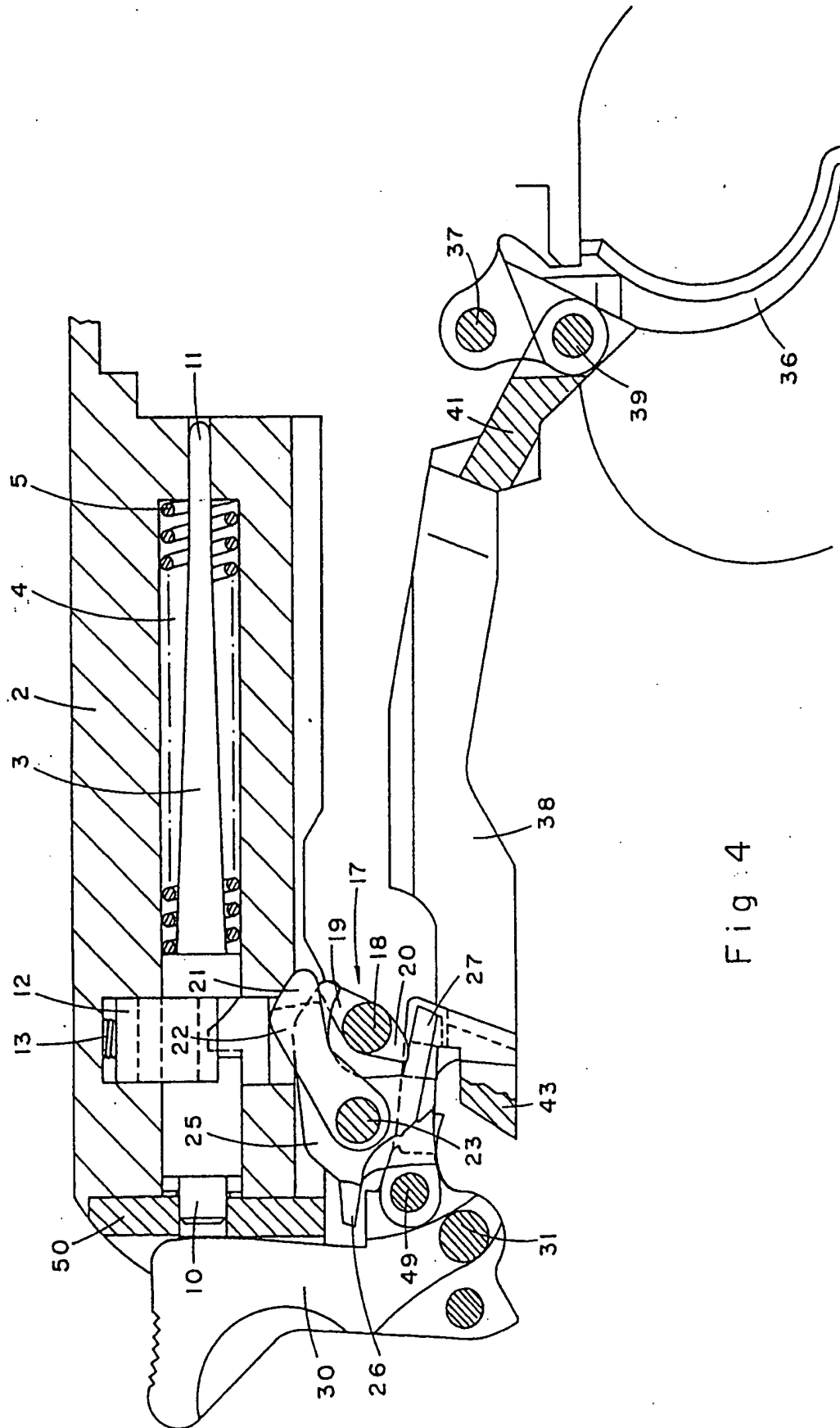


Fig. 1









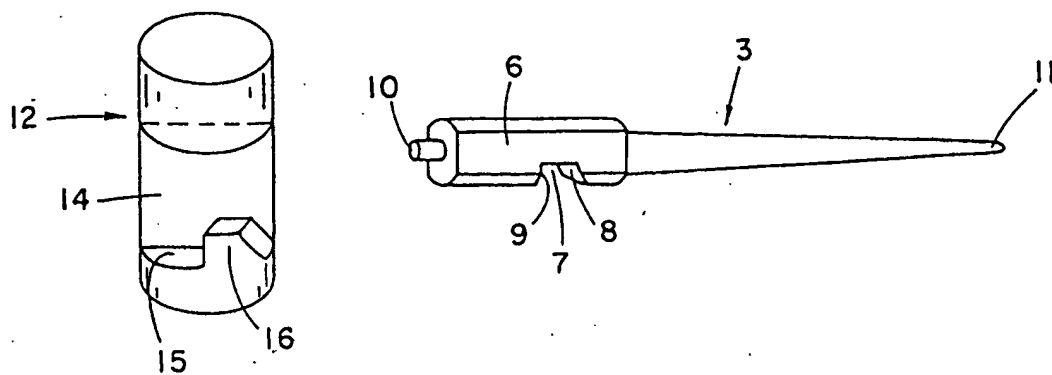


Fig. 5

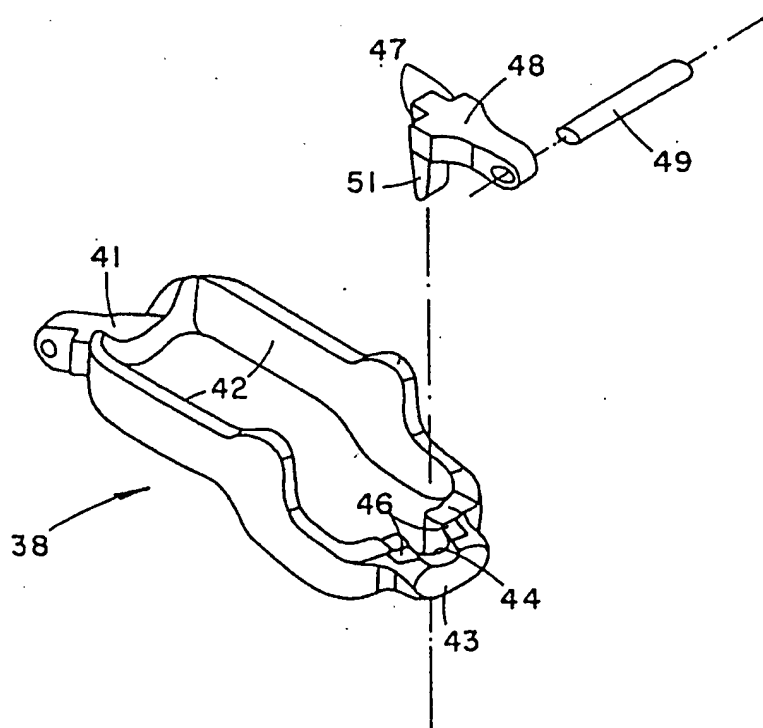


Fig. 6



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# EUROPEAN SEARCH REPORT

Application Number  
EP 95 11 0305

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US-A-5 267 407 (BORNANCINI) * the whole document *	1,2	F41A17/64
Y	DE-A-38 08 102 (CARL WALTHER GMBH) * column 2, line 56 - column 4, line 47; figures 1-7 *	1,2	
A	GB-A-2 137 324 (SMITH) * page 6, left column, line 20 - right column, line 72; figures 1,2,41-43 *	1,2	
A	US-A-4 726 136 (DORNAUS ET AL.) * column 4, line 44 - column 5, line 57; figures 3-6 *	1	
A	US-A-5 157 209 (DUNN) * column 6, line 6 - column 7, line 32; figures 2-6 *	1	
A	US-A-3 750 531 (ANGELL ET AL.) * column 3, line 34 - column 4, line 20; figures 1-8 *	2	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	CH-A-136 075 (BRED A)		F41A
A	DE-C-555 758 (MAUSER-WERKE AG.)		
A	GB-A-181 490 (FEARN ET AL.)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 December 1995	Examiner Giesen, M
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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